No. 646,731. Patented Apr. 3, 1900.

# H. J. A. & N. A. GIROUX.

## ACETYLENE GAS GENERATOR.

(Application filed Nov. 12, 1898.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

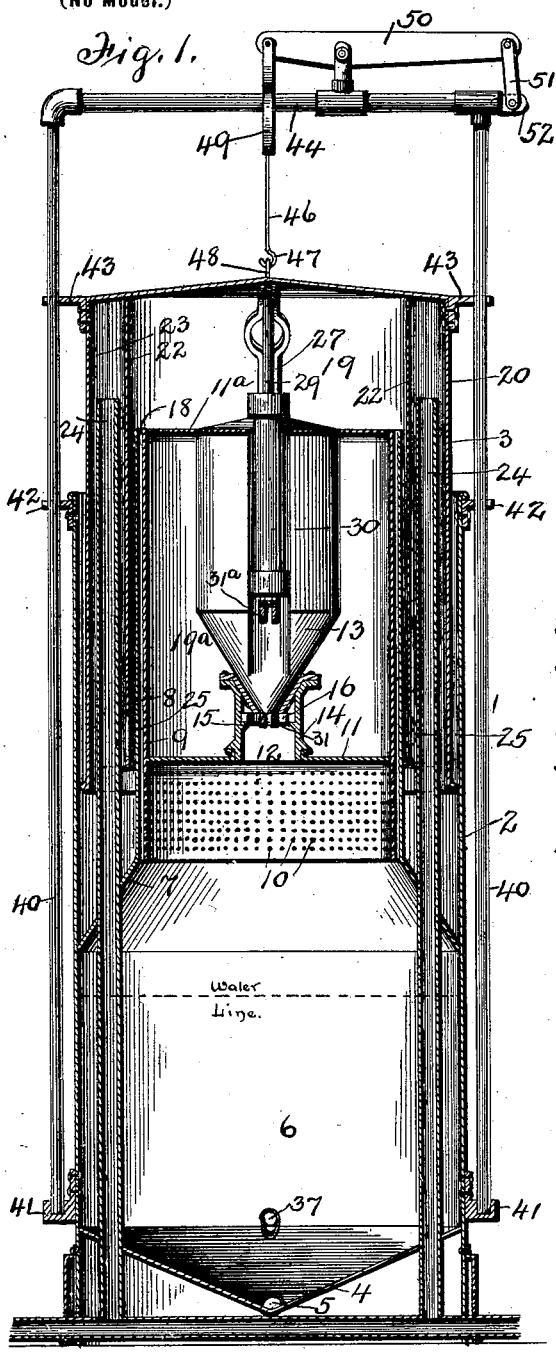
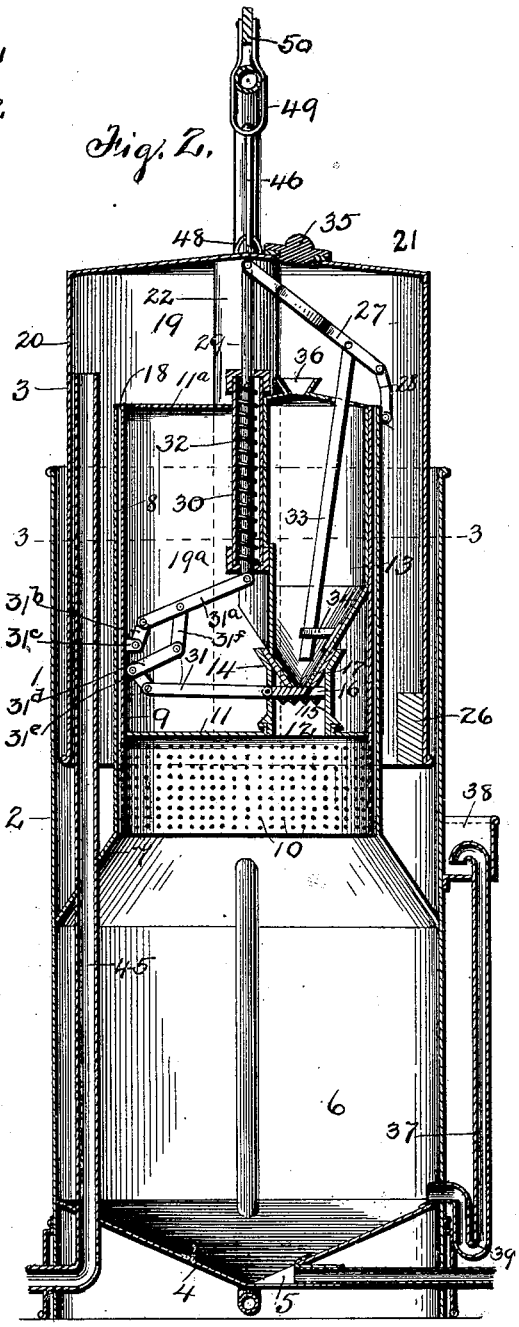



Fig. 2.




Witnesses:
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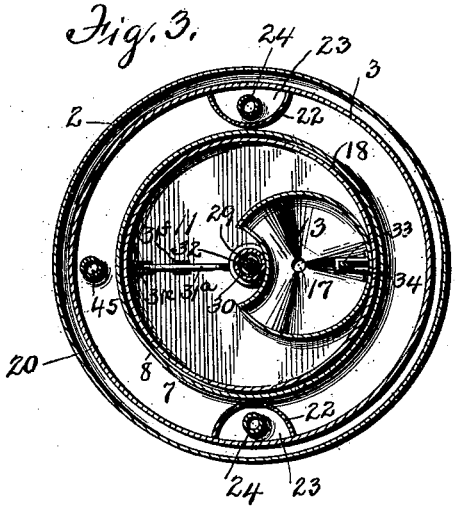
(No Model.) 2 Sheets—Sheet 2.

Fig. 3.



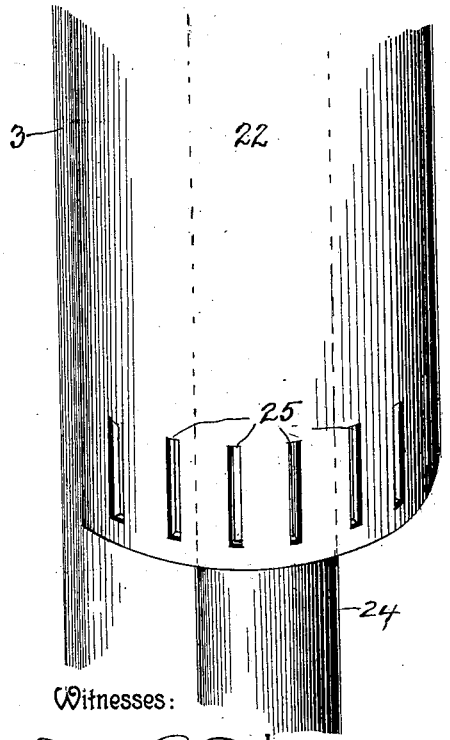
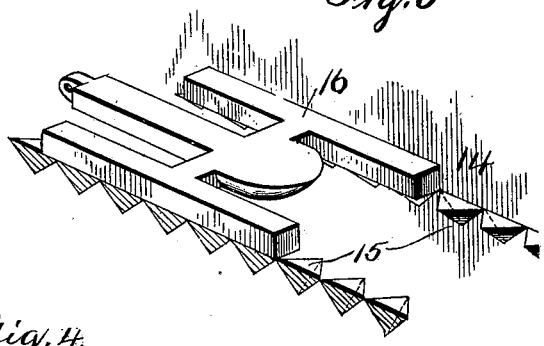




Fig. 4.

Fig. 5

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# UNITED STATES PATENT OFFICE.

HENRI JOSEPH AZARIE GIROUX AND NARCISSE AZA GIROUX, OF CHARLESBOURG, CANADA.

## ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 646,731, dated April 3, 1900.

Application filed November 12, 1898. Serial No. 696,267. (No model.)

*To all whom it may concern:*

Be it known that we, HENRI JOSEPH AZARIE GIROUX and NARCISSE AZA GIROUX, subjects of Her Majesty the Queen of Great Britain, residing at Charlesbourg, county of Quebec, Province of Quebec, Canada, have invented certain new and useful Improvements in Acetylene-Gas-Generating Apparatus; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to improvements in acetylene-gas-generating apparatus.

One object of our invention is to provide a device of this character in which the generating-chamber and accessories are located entirely within the gas-holder, thus economizing space.

A further object is to provide the gas-holder with independent compartments, in one of which the gas is formed and from which it is passed into a separate compartment, where it is stored until used.

A further object is to provide a valve to regulate the passage of the carbid from the carbid-chamber, the movement of the valve being regulated by the movement of the movable section of the gas-holder.

A further object is to provide a safety appliance whereby surplus gas will be caused to escape to the outer atmosphere.

To these and other ends our invention consists in the improved construction and combination of parts hereinafter fully described, and particularly pointed out in the appended claims.

In the drawings, in which similar numerals of reference indicate similar parts in all of the views, Figure 1 is a vertical sectional view taken through the gas-holder, showing the interior arrangement of the same, the carbid-receptacle not being shown in section. Fig. 2 is a similar view taken at right angles to Fig. 1, showing the parts shown in Fig. 1 and also showing the carbid-receptacle in section, the valve and its operating mechanism, and the water-supply. Fig. 3 is a horizontal sectional view taken on the line 3 3 of Fig. 2. Fig. 4 is a detail view showing the inner downwardly-extending flange formed on the movable section of the gas-holder and showing the openings for the passage of the gas from the holder when a surplus amount of gas has been formed. Fig. 5 is a detail view of the valve.

Among the many acetylene-gas machines now in use there are to be found many varying systems, in most of which are to be found a great variety of separable chambers, &c. In all of these it is required that a considerable space be provided for the working of the apparatus and also that a number of separate constructions be formed, each of which requires a maximum amount of manufactured work. Reference is made particularly to the forming of independent gas-holding and gas-generating machines. It is our purpose to minimize the cost of construction of these parts and also the space required to operate them, and to accomplish this we place the gas-generator within the gas-holder in the manner hereinafter described, thus inclosing all the operating parts within the outer telescoping gas-holder and confining all liability of the leakage of gas within the holder, which is kept sealed from the outer and surrounding atmosphere.

In the drawings, 1 designates the gas-holder, comprising the outer stationary section 2 and the inner telescoping section 3, arranged in the usual form with a provision for the usual water seal between them. The section 2 has its bottom arranged in the form of an inverted cone, as at 4, the apex of which is provided with an opening 5, as best shown in Fig. 2, to allow of a ready cleansing of the generating-chamber 6.

As shown in Figs. 1 and 2, the section 2 is divided into compartments by means of the angularly-inclined portion 7 and its upwardly-extending flange 8, the portion 7 being secured to the casing 2 at a suitable point above the bottom 4, the compartment within the portion 7 forming the generating-chamber 6, while the annular compartment formed on the outer side of the portion 7 and the flange 8 is intended to receive the water forming the water seal between the various parts of the apparatus.

Secured within the flange 8, but of somewhat less diameter than said flange, is a cy-

lindrical portion 9, having a portion of its length near the lower end thereof provided with perforations 10, said perforations forming a passage-way between the generating-chamber and the annular space formed between the flange 8 and the cylindrical portion 9. A diaphragm 11 is secured within said cylindrical portion, extending across the same at a point a small distance above the perforations 10, the diaphragm 11 serving to complete the closed generating-chamber in an obvious manner and also serving as a support for the carbid-receptacle and its operating parts. The diaphragm is provided with an opening 12, which leads to the lower end of the carbid-receptacle 13, which latter is located within and connected to the cylindrical portion 9. The top of the portion 9 is closed, practically hermetically, by a suitable diaphragm $11^a$, the space inclosed by the portion 9 and diaphragms 11 $11^a$ forming a closed compartment $19^a$ for the reception of the operative parts hereinafter described. The carbid-receptacle is mounted on suitable supports 14, said supports being provided with suitable slides 15, on which is mounted the sliding valve 16, (best shown in Fig. 5,) said valve being adapted to close the outlet-opening 17 of the carbid-receptacle 13.

It will be apparent from the foregoing construction that when a quantity of water is placed within the generating-chamber 6, by means hereinafter described, and the valve 16 be opened the carbid within the receptacle 13 will pass downward through the openings 17 12 into the water, whereupon gas will be formed and pass out of the generating-chamber through the perforations 10 into the annular space 18, formed between the flange 8 and the cylindrical portion 9, and as the space 18 extends the entire length of the flange 8, having no closing means at its upper and lower ends, the gas will also pass directly from the generating-chamber into said space and be carried upward into the gas-holding compartment 19.

The inner section 3 has its outer downwardly-extending flange 20 of sufficient length to pass within the water seal formed without the flange 8 and pass downward close to the upper side of the inclined portion when said section is in its lowermost position. Connected to the under side of the top 21 of the section 3 within the flange 20 are two semicircular downwardly-extending flanges 22 22, said flanges extending downward to within a short distance of the lower end of the flange 20, the space between the flange 20 and the flanges 22 forming a compartment 23, within each of which is located the vertical pipe 24, extending downwardly through the inclined portion 7 and bottom 4 into a suitable outlet-pipe having a connection with a suitable point, such as a sewer, &c. The flanges 22 are provided near their lower ends with a number of openings 25, which normally remain below the level of the water seal and are only brought into action when the section 3 of the holder has been raised a sufficient distance by the excessive formation of gas to allow the openings 25 to pass above the level of the water seal, when the gas in the gas-holder will pass outward through said openings 25 into the compartments 23 and outward through the pipe 24 away from the generator, thus forming a safety device, the passage of the gas through the openings 25 relieving the pressure of the holding-compartment 19, allowing the section 3 to move downward, and thus automatically close the openings 25 by passing them below the level of the water seal. Suitable weights 26 are connected to the interior of the flange 20 and serve to form a counterbalance for the pressure developed by the gas.

The valve 16 is adapted to be moved into and out of position below the opening 17 of the carbid-receptacle 13, and as this must be accomplished automatically we have provided an arrangement of parts whereby the movement of the section 3 will cause a corresponding movement on the part of the valve, and thus open or close it, as is necessary in the automatic working of the machine. To give this automatic movement to the valve 16, we provide a lever 27, pivotally connected to a link 28, pivotally mounted in bearings formed on the outer surface of the flange 8, said lever 27 extending inwardly to a point directly beneath the center of the top 21, and at its inner end is pivotally connected to the upper end of a vertically-sliding rod or piston 29, mounted within a cylindrical casing 30, connected to the carbid-receptacle 13. To the lower end of the rod or piston 29 is secured one end of an arm or lever $31^a$, connected at its opposite end by means of a link $31^b$ to a stud or support $31^c$, secured to the walls of the chamber $19^a$. A bell-crank lever $31^d$ is pivotally mounted in a bracket or support $31^e$ below the support $31^c$, said bell-crank lever being connected through the medium of a connecting-bar $31^f$ to the arm or lever $31^a$ intermediate the ends of the latter, the opposite end of said bell-crank lever being connected by means of the connecting-rod 31 to the valve 16. It will be readily seen that with these parts in the positions as shown in Fig. 2 of the drawings the valve 16 will be held in a position where the opening 17 will be closed until the section 3 begins its downward movement by reason of the use of the gas within the compartment 19 and that when such movement begins the rod or piston 29 will be caused to move downward vertically against the action of a spring 32, mounted on said rod or piston within the cylinder 30, and by such movement and the connection with the arms and levers cause the reciprocating connecting-rod 31 to be moved, causing the valve 16 to be gradually drawn away from the opening 17, thus allowing of the escape of the carbid from the receptacle and causing new gas to be formed. As the new gas is formed the sec-

tion 3 will be caused to move upwardly, whereupon the spring 32 will force the rod or piston 29 upwardly and gradually cause the valve 16 to resume its position to close the opening 17. 33 designates a rod pivotally mounted on the lever 27 and extending downward into the carbid-receptacle within a short distance of the opening 17, the lower end of the rod being held in position by means of a suitable bearing 34, located on the inner side of the receptacle. When the section 3 moves downwardly, the rod or piston 29, necessarily moving in a vertical position, will cause the link 28 to move outwardly to compensate for the length of the lever 27, this movement of the link 28 and the lever 27 causing the rod 33 to be moved downwardly and at the same time have its upper end moved outwardly to bring it into a direct alinement with the opening 17, this rod 33 serving as a plunger to force the carbid through the opening 17 in an obvious manner.

The top 21 is provided with a suitable removable air-tight plug 35, located at a point directly above the opening 36, formed in the carbid-receptacle, and serves to allow of the introducing of carbid to the carbid-receptacle, a funnel or other suitable means being provided for the purpose of allowing it to pass within the receptacle in an expeditious manner.

Water is supplied automatically to the generating-chamber by means of the pipe 37, arranged on the outer side of the section 2, as shown in Fig. 2, the upper end of the pipe being arranged to have its opening at a point below the level of the water contained within the reservoir 38, which is kept supplied in any suitable manner, the lower end of the pipe 37 opening into the generating-chamber, a suitable trap or siphon 39 being arranged within said pipe near its lower end to prevent any leakage of gas through the water-feed pipe.

The section 3 is guided in its movements by means of the uprights 40, secured to the side of the section 2, and held in position by means of suitable supports 41 42, arranged on said section, suitable guides 43, secured to the section 3, serving to hold the said section 3 in its central position. The upper ends of said uprights 40 are connected by a suitable cross-bar 44, as best shown in Fig. 1.

It will be readily understood that after the gas has been formed in the generating-chamber, as hereinbefore set forth, it will pass through the openings 10 or directly into the annular space 18, passing through the latter into the gas-holding chamber or compartment 19, from where it will be passed through the outlet-pipe 45 into the house-supply pipes. Should a surplusage of gas be formed, it will cause the section 3 to rise a sufficient distance to expose the openings 25 above the level of the water seal, and thus allow the gas to escape from the generating-chamber and the compartment 19 into the compartment 23, and thence to the outer atmosphere, as described.

As there is a continuous pressure formed within the compartment 19 and the generating-chamber, it will be apparent that should the plug 35 be removed the entire section 3 would be caused to drop downward and allow of the escape of the gas from the compartment 19. In order that this may be prevented and the section 3 be held in a stationary position, we have provided a suitable rod 46, having its lower end formed with a hook 47, which is adapted to be placed within a suitable eye 48, secured to the top 21, the rod 46 being connected to a suitable pivotally-mounted strap 49, connected to a lever 50, secured to the cross-bar 44, the free end of the lever 50 being connected by means of the link 51 with a plug 52, secured within said cross-bar, as best shown in Fig. 1. When the apparatus is in operation, the hook 47 will be free from engagement with the eye 48, allowing the section 3 to have a free movement, the hook being used only when the carbid-receptacle is being filled.

The advantages of this construction are thought to be obvious, and as a few of them have heretofore been set forth it is not thought necessary to reiterate them.

Minor changes in the form and proportion of the parts forming our construction may be made, and it is to be understood that we do not limit ourselves to the precise construction and combination of parts as shown and described, but reserve the right to use any and all modifications of the said construction in so far as said modifications and changes may fall within the spirit and scope of our invention, as clearly set forth in the appended claims.

By forming the portion 9 with a closed top practically hermetically sealed, as hereinbefore set forth, the entire operating mechanism is located within a compartment to which the gas has no entrance, so that the parts upon which dependence must be placed for the proper feeding of the carbid will be kept free from any liability of becoming subjected to the action of dampness, which may be found in apparatus of this character when not provided with drying means. In addition to this, the carbid-receptacle being in an entirely separate portion of the mechanism and none of the operating parts, with the exception of the plunger 33, having any communication with the receptacle, there is absolutely no liability of the parts becoming clogged in any manner.

Having thus described our invention, what we claim as new is—

1. An acetylene-gas-generating apparatus, comprising a gas-holder; a generating-chamber formed within said holder; a gas receiving and retaining compartment located above and having operative connection with said chamber; a closed chamber formed within

said compartment; a carbid-receptacle; and means, located within said closed chamber and operated by the movement of the telescoping member of said gas-holder, for passing the carbid from said receptacle to said generating-chamber, substantially as described.

2. In a self-contained acetylene-gas-generating apparatus, the combination with the telescoping gas-holder; of a closed chamber located therein, said chamber being held stationary; a carbid-receptacle located within said chamber, arranged to deliver carbid to the generating-chamber; and means, located within said closed chamber, for automatically opening and closing the carbid-outlet, said means being operated by the movement of said gas-holder, substantially as described.

3. In a self-contained acetylene-gas-generating apparatus, the combination with the telescoping gas-holder; of a closed chamber located therein, said chamber being held stationary; a carbid-receptacle located within but independent of said chamber; a carbid-outlet located at the lower end of said receptacle, said outlet having communication with the generating-chamber; a horizontally-sliding valve mounted in juxtaposition to said outlet, adapted to regulate the flow or passage of carbid therefrom; a series of operating arms and levers located entirely within said closed chamber, for imparting a positive movement to said valve; a spring-actuated rod located within said chamber and having operative connection with said levers, said rod extending out of said chamber and being adapted to be moved in one direction by the movement of said gas-holder; and a plunger, operated by the movement of said rod, and extending into said carbid-receptacle, for moving the carbid through its outlet, substantially as described.

In witness whereof we have hereunto set our hands in the presence of two witnesses.

HENRI JOSEPH AZARIE GIROUX.
NARCISSE AZA GIROUX.

Witnesses:
W. B. DELAGE,
CYRILLE F. DELAGE.